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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/649,260

08/25/2003

Anand G. Dabak

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EXAMINER

PHAN, MAN U

ART UNIT

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2616

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/649,260	Applicant(s) DABAK ET AL.	
	Examiner Man Phan	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 16-23 and 25 is/are rejected.
- 7) ☒ Claim(s) 14, 15, 24 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5/31/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The application of Dabak et al. for the "Multi-carrier reception for ultra-wideband (UWB) systems" filed 08/25/2003 has been examined. This application claims priority from provisional application 60/409,662 filed 09/10/2002. Claims 1-26 are pending in the application.
2. The applicant should use this period for response to thoroughly and very closely proof read and review the whole of the application for correct correlation between reference numerals in the textual portion of the Specification and Drawings along with any minor spelling errors, general typographical errors, accuracy, assurance of proper use for Trademarks TM, and other legal symbols @, where required, and clarity of meaning in the Specification, Drawings, and specifically the claims (i.e., provide proper antecedent basis for "the" and "said" within each claim). Minor typographical errors could render a Patent unenforceable and so the applicant is strongly encouraged to aid in this endeavor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-13 and 16-23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US#6,920,173) in view of Kim (US#6,810,007).

With respect to claims 16, 25, the references disclose a novel system and method for receiving transmissions in a wireless communication system with a large data bandwidth, according to the essential features of the claims. Nakamura et al. (US#6,920,173) disclose a spread-spectrum signal receiver apparatus for receiving a spread-spectrum signal, which has been spread by a spreading code comprising a combination of a first code decided by a spreading factor and a second code that differs for every user, and demodulating transmit data from the received signal, and to an interference cancellation apparatus for generating a replica of an interference signal from the received signal (Col. 8, lines 60 plus). As shown in Fig. 1 for the structure of an interference cancellation unit are a receiver 100, an interference cancellation unit 200 according to this embodiment, and a receive demodulator 400. The interference cancellation unit 200 is provided for each user channel within the interference canceller (see Fig. 17); only one channel is shown in Fig. 1. The interference cancellation unit 200 includes a despreader 201 for multiplying a receive signal S by a despreading code that is identical with the spreading code, thereby outputting a despread signal; a demodulator 202 for demodulating "1", "0" of user data and control data on the basis of the result of despreading; an attenuator 203 for attenuating the

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demodulated signal by multiplying the result of demodulation by a damping coefficient that conforms to the degree of reliability; a re-spreader 204 for spreading the demodulated signal again to thereby output an interference replica; and a symbol-replica interface 205 for creating and sending a symbol replica (Col. 12, lines 40 plus).

However, Nakamura does not disclose expressly the redundancy elimination circuit coupled to the ADC for removing of cyclic prefix. In the same field of endeavor, Kim (US#6,810,007) teaches an orthogonal frequency division multiplexing (OFDM) transmission/receiving system and a block encoding method therefor. Fkim teaches in Fig. 1B a block diagram of an orthogonal frequency division multiplexing (OFDM) receiving system for receiving a signal transferred from the transmission system of Fig. 1A. The receiving system of Fig. 1B includes an LPF 110, an analog-to-digital converter (ADC) 111, a cyclic prefix remover 112, an FFT 113, a Q-ary demodulator 114, a parallel-to-serial converter (PSC) 115, and a block decoder 116. The LPF 110 in the receiving system filters the transmitted OFDM signal at the same frequency band as the LPF 106 of the transmission system. The ADC 111 converts a filtered signal into a digital signal, and the cyclic prefix remover 112 removes the cyclic prefix added in the transmission system. The FFT 113, the Q-ary demodulator 114, the PSC 115 and the block decoder 116 perform inverse processes of the processes performed by the counterparts of the transmission system, thereby restoring an OFDM signal (See Fig. 2A; Col. 3, lines 39 plus).

It's noted that a number of different types of multi-carrier or OFDM systems including, but not limited to, Ultra-Wideband (UWB), Wireless Local Area Network (WLAN), 802.16e, and 3.9 and fourth generation (4G) cellular systems utilizing the IEEE 802.15.3a standard. In

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general, UWB transmitter taking advantage of both code division multiple access (CDMA) and orthogonal frequency division multiplexing (OFDM) techniques to create a multi-carrier UWB transmitter. The multi-carrier UWB is capable of avoiding interferers by eliminating signal transmissions in the frequency bands occupied by the interferers.

Regarding claims 17-19, Nakamura further teaches wherein at a transmitter, symbols to be transmitted are first spread with a first spreading code and then modulated (Fig. 10; Col. 1, lines 24 plus).

Regarding claims 20, 23, Kim further teaches wherein the redundancy elimination circuit (REC) contains circuitry to remove replicated symbols and cyclic redundancies (Fig. 2A; Col. 3, lines 39 plus)

Regarding claims 21-22, Kim further teaches in Fig. 1B a block diagram of an orthogonal frequency division multiplexing (OFDM) receiving system for receiving a signal transferred from the transmission system, wherein at a transmitter, symbols to be transmitted are modulated using orthogonal frequency division multiplexing (OFDM), and wherein the demodulator applies a Fourier transform to the digital symbol (Col. 1, lines 24 plus).

With respect to claims 1-13, they are method claims corresponding to the apparatus claims 16-23, 25 as discussed in paragraph above. Therefore, claims 1-13 are analyzed and rejected as previously discussed with respect to claims 16-23, 25.

One skilled in the art of communications would recognize the need for a novel system and method for receiving OFDM transmissions in spread spectrum signal receiver, and would apply Kim's novel use of a redundancy elimination circuit coupled to the ADC for removing of cyclic prefix into Nakamura's method for receiving a spread spectrum signal and demodulating

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transmit data from the signal. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Kim's OFDM transmission/receiving system and block encoding method therefor into Nakamura's spread spectrum signal receiver apparatus and interference cancellation apparatus with the motivation being to provide a system and method for a multi carrier reception for UWB systems.

Allowable Subject Matter

6. Claims 14-15 and 24, 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is an examiner's statement of reasons for the indication of allowable subject matter: The closest prior art of record fails to disclose or suggest wherein there are a plurality of ADC and digital sections forming a plurality of ADC and digital units (ADU), and the receiver further comprising a plurality of filters and mixer units, wherein each filter and mixer unit has an input coupled to the analog section and an output coupled to an ADU, the filter and mixer unit containing circuitry to extract a frequency band from a signal provided by the analog section and to mix the frequency band to an intermediate frequency, as expressly recited in the claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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The Kim et al. (US#6,459,679) is cited to show the method and apparatus for synchronizing OFDM receiver.

The Jabbar et al. (US#6,985,548) is cited to show the system and method for timing recovery in a DMT system.

The Wang et al. (US#2002/0168016) is cited to show the method and apparatus for reducing peak to average power ratio in a multi carrier modulation communication system.

The Harikumar et al. (US#6,631,175) is cited to show the spectrally constrained impulse shortening filter for a DMT receiver.

The Dollard (US#7,072,411) is cited to show the computation reduction in OFDM system using frequency domain processing.

The Fitton et al. (US#2004/0017843) is cited to show the receiver processing systems.

The Dahlman et al. (US#6,222,875) is cited to show the low delay rate detection for variable rate communication systems.

The Belotserkovsky et al. (US#6,771,591) is cited to show the method and system for processing OFDM signals.

The Komatsu (US#5,881,057) is cited to show the synchronous detector with reduced error computation for maximal ratio combining.

The McCorkle et al. (US#7,010,056) is cited to show the system and method for generating UWB pulses.

The McCorkle et al. (US#6,901,112) is cited to show the UWB spread spectrum communication system.

The Boesel et al. (US#2004/0071199) is cited to show the virtual finger method and apparatus for processing digital communication signals.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (571) 272-3149. The examiner can normally be reached on Mon - Fri from 6:00 to 3:00.

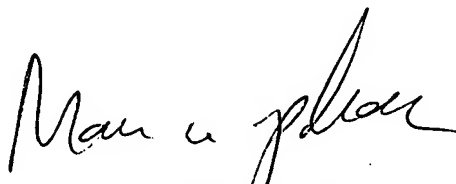
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin, can be reached on (571) 272-3134. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at toll free 1-866-217-9197.

Mphan

04/10/2007.



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PRIMARY EXAMINER